Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to Promote Aviation Safety	)	WT Docket No. 19-140
	)	
WiMAX Forum Petition to Adopt Service Rules for the Aeronautical Mobile Airport Communications System (AeroMACS)	)	RM-11793
	)	
Petition of the Sierra Nevada Corporation for Amendment of the Commission's Rules to Allow for Enhanced Flight Vision System Radar under Part 87	)	RM-11799
	)	
Petition of Aviation Spectrum Resources, Inc. for Amendment of Sections 87.173(b) and 87.263(a) of the FCC's Rules to Allow Use of the Lower 136 MHz Band by Aeronautical Enroute Stations	)	RM-11818
	)	
Petition of Airport Council International-North America Regarding Aeronautical Utility Mobile Stations	)	RM-11832
	)	

COMMENTS OF COLLINS AEROSPACE

Collins Aerospace, a unit of United Technologies Corp., hereby submits comments in response to the Federal Communications Commission ("FCC" or "Commission") Notice of Proposed Rulemaking to amend part 87 of the Commission's rules to promote aviation safety.[1]

[1] *Amendment of the Commission's Rules to Promote Aviation Safety*, Notice of Proposed Rulemaking, FCC No. 19-53, WT Docket No. 19-140 (rel. June 7, 2019) ("NPRM").

I. INTRODUCTION AND SUMMARY

Collins Aerospace (or "Collins") is a leader in technologically advanced and intelligent solutions for the global aerospace and defense industry. Created in 2018 by bringing together Rockwell Collins and UTC Aerospace Systems, Collins Aerospace has the capabilities, comprehensive portfolio and expertise to solve customers' toughest challenges and to meet the demands of a rapidly evolving global market as a world-leading developer and supplier of avionics to the business, commercial, and military aviation markets. In addition, Collins provides connectivity and managed data service solutions for aircraft operators. Since 1978, Collins Aerospace has been providing high reliability datalink service through its ARINC GLOBALink℠ service (also known as ACARS®). Collins Aerospace provides over 3 million safety-of-flight datalink messages per day to over 10,000 air transport class commercial aircraft through GLOBALink.

Collins has a keen interest in this proceeding as an integral stakeholder in improving aviation safety and efficiency throughout its history. Most recently, Collins has been engaged as a partner with the Federal Aviation Administration ("FAA") and industry stakeholders on the Next Generation Air Transportation System ("NextGen") modernization program. Further, Collins Aerospace has been an integral stakeholder in the FAA NextGen program Data Communications ("Data Comm"), which will enhance aviation safety by providing pilots with clear digital communications, as opposed to relying on voice communications with Air Traffic Control ("ATC"), through one simplified terminal. In addition, Collins manufactures Enhanced Flight Vision Systems ("EFVS") and Head-up Displays ("HUDs") that integrate live infrared imagery of the landing environment with precise head-up guidance cues, providing improved landing performance and increased situational awareness, which are integral to NextGen. As a

key stakeholder, Collins supports adoption of the proposed rules to continue enhancements to the safety and efficiency of the aviation system.

II. COLLINS SUPPORTS AMENDMENT TO AES RULES, AS PETITIONED BY ASRI

Collins fully supports the Commission in its proposal to revise part 87 rules pertaining to the Aeronautical Enroute Service ("AES") to enable use of the entire 136 MHz band. As Collins previously stated in the Aviation Spectrum Resources, Inc. ("ASRI") petition for rulemaking proceeding, "[i]nitiating a rulemaking to amend Sections 87.173(b) and 87.263(a) of the Commission's Rules to allow use of the lower 136 MHz band by aeronautical enroute stations is timely, necessary, and has been fully vetted and supported by the aviation industry and the FAA."[2]

ASRI's proposal is critical to enhancing aviation safety as it will allow the use of the 136.000-136.4875 MHz band for the AES, which will enable both Aeronautical Operational Control ("AOC") and FAA Air Traffic Control ("ATC") communications using FCC-licensed aeronautical enroute stations. As the Commission rightly notes, this band was originally intended for shared ATC services, whereas the "upper 136-137 band" (136.500 to 136.975 MHz), was originally intended primarily for airlines' Aeronautical Operational Control ("AOC") communications.[3] By 2000, the upper 136-137 MHz band was reserved for a new industry standard, high-speed, data communications system, referred to as VHF Data Link communications (or "VDL"). VDL was designed to meet the requirements for ATC and to share both AOC and ATC communications on a single VHF channel.

[2] Comments of Collins Aerospace at 3, RM-11818 (filed Dec. 4, 2018).

[3] NPRM ¶ 28.

With the introduction of the FAA's highly successful Data Comm program, the upper VDL band is already being shared for both AOC and ATC applications; therefore, the ASRI proposal is a natural extension of the shared ATC and AOC channel use concept. Current FAA Data Comm models predict that a total of nine VHF frequencies or channels will be required within the next decade. The re-assignment of the entire 136-137 MHz band for shared ATC and AOC communications will serve this needed growth for the next decade and beyond.

One of the fundamental concepts of the Data Comm program was to accelerate the rollout of services and benefits to the FAA and airline operators by leveraging existing technologies, ground infrastructure and aircraft equipage. This approach has greatly reduced the required investment by the U.S. government in ground radios and networks, as well as the airlines in avionics. Data Comm uses the existing infrastructure of data link service providers, such as ARINC (a part of Collins Aerospace), and avionics products that have been deployed on many aircraft since the early 2000s. As such, there are no added costs to proceed with the proposal; Collins and the aviation industry are already proceeding with the most cost-efficient approach.

The Commission notes that when AOC and ATC traffic is shared on a specific frequency and aeronautical enroute station, the station licensee and the FAA must agree on a specific traffic sharing methodology.[4] Existing data link standards (such as ARINC Standard 618 and 631) provide the requirements and a specific methodology for ensuring that the ATC message will have priority over and pre-empt AOC messages. The FAA Data Comm program office has specified these and additional performance requirements in the contract requirements to their data link service providers. Therefore, we believe that the intent of the proposed language that

[4] NPRM ¶ 32.

"the specific frequencies and traffic sharing methodology must be agreed upon with the FAA" is already met through existing standards and practices.[5]

The Commission inquired whether there are possible alternatives to accommodate Data Comm.[6] There is no other viable near- or mid-term alternative that would serve as a substitute to this proposal to serve the Data Comm program. The FAA and the aviation industry have invested significant resources into the program; any effort to seek an alternative would be cost-prohibitive and would impede the FAA's NextGen program.

In summary, Collins fully supports the rules proposed by the Commission for the AES proposal as it serves the public interest with enhanced aviation safety and does so in an efficient and cost-effective manner. By swiftly adopting the proposed rules, the Commission will ensure the Data Comm program has the building blocks it needs to be successful and will enhance aviation safety.

III. ACCOMMODATING THE EFFECTIVE AND EFFICIENT USE OF EFVS RADAR IS IN THE PUBLIC INTEREST

Collins Aerospace concurs with the FCC's tentative conclusion that accommodating the effective and efficient use of EFVS is in the public interest.[7] Collins manufactures EFVS systems that are integrated in HUDs based on infrared imagery. EFVS technology enables increased flexibility for pilots to land in more locations with increased frequency, including when weather and visibility conditions are poor. As the Commission rightly notes, "Implementation of Enhanced Flight Vision Systems can increase opportunities for flights to

[5] NPRM App. A, ¶ 14.

[6] NPRM ¶ 32.

[7] NPRM ¶ 10.

land in conditions that otherwise would close airports."[8] Collins concurs, and adds that EFVS can be implemented not only during landing, but also in takeoff environments.[9] During the landing phase of flight, the technology aids the pilots' eyes by enabling the pilot to detect the runway environment before it is visible to the human eye. When EFVS is integrated in a HUD, additional safety features can be overlaid to provide the pilot with clearer vision overall. This enables planes to get on the ground more safely and quickly, producing both environmental and safety benefits.

While Collins Aerospace agrees that millimeter wave systems potentially provide a useful enhancement to degraded visual operations, Collins disagrees with the statement by Sierra Nevada that "millimeter wave radar is superior to existing technology using infrared camera sensors."[10] Collins and other manufacturers have demonstrated that infrared technology provides significant advances to degraded visual conditions, and is the only system that meets current FAA requirements for EFVS.[11]

The NPRM also notes that Sierra Nevada has suggested that the "90 GHz band is the optimal frequency range to maximize obscurant penetration . . . and radar resolution."[12] This statement is factually incorrect, as numerous systems at other frequency bands have been demonstrated to be both equally beneficial to the operation and fit under aircraft radomes. Millimeter wave systems are not limited to the identified spectral band, and further include a

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[8] *Id.*

[9] Standards are currently being developed by RTCA for EFVS systems to be used during takeoff as well. *See* Radio Technical Commission for Aeronautics (RTCA), Safety Performance and Interoperability Requirements Document Defining Takeoff Minima by Use of Enhanced Flight Vision Systems (EFVS) (2018).

[10] NPRM ¶ 11.

[11] *See generally* 47 C.F.R. § 91.176.

[12] NPRM ¶ 11.

number of transmissive atmospheric bands between about 10 and 95 GHz, as well as around 220 GHz and above. The specific band identified at 90 GHz is the result of engineering and product development tradeoffs, as opposed to a fundamentally beneficial spectral band. For example, Collins Aerospace demonstrated X-band runway-finding radar within an aircraft radome in 2015.[13] Further, NASA and DARPA studies demonstrated 35 GHz and 94 GHz systems fitting this description as part of the FAA Synthetic Vision Technology Demonstration.[14]

Overall, Collins concurs with the Commission adopting the rules proposed in the NPRM related to operating EFVS with millimeter wave systems. However, Collins notes that the development of future radar-based EFVS systems might require the Commission to explore alternative frequency bands and associated changes to part 87 in the future.

IV. AEROMACS SERVICE RULES SHOULD BE ADOPTED WITH AN INDEPENDENT SPECTRUM MANAGER

Collins agrees with the Commission's proposed rules related to the WiMAX Forum's petition seeking the adoption of Aeronautical Mobile Airport Communications System ("AeroMACS") service rules. With regard to channel management specifically, Collins recommends that an independent, neutral third party be established to act as the spectrum resources and allocation manager for the industry. The manager should be appointed on a nationwide basis to one entity. A strong model that the Commission could consider is that of the AES, which is managed by ASRI. This model has served the aviation industry well, especially with regard to VHF channel assignments.

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[13] John Croft, *Radar Diversity*, Aviation Wk., Jan. 15 – Feb. 1, 2015, at 61.

[14] Malcolm A. Burgess, *Synthetic vision for low-visibility aircraft operations: what we know and what we do not know*, 2220 Proc. of SPIE (1994); and DARPA's Autonomous Landing Guidance program (SPIE Proceedings Volume 2463, Synthetic Vision for Vehicle Guidance and Control (1995).

V. CONCLUSION

Collins Aerospace commends the Commission on its progress in making needed updates to part 87 that serve the public interest by taking into account technological advances that will improve aviation safety and efficiency. The proposed rules related to AES are critical to the continued success of the FAA Data Comm program. Further, adoption of rules related to EFVS is important for advancing new developments in EFVS technology. Lastly, Collins urges the Commission to appoint an independent and neutral third party channel manager, similar to the model it uses for AES, when implementing AeroMACS. In summary, the Commission should take swift action to adopt the proposed rules set forth in the NPRM.

Respectfully submitted,

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